Integrated Mathematics 2 End of Course Exam Recommendations
Math Workgroup: November 15th and 16th, 2013
NDE Workgroup: April 14th, 2014
Recommended Content for Integrated Math 2 End of Course Exam

①Standards	③Content Cluster Summary
HSG.CO.C.10 Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*	The following knowledge, skills, and abilities are represented in these standards: • Use the idea of shape and size to formulate logical arguments. • Construct logical arguments and critique the reasoning of others
HSG.CO.C.11 Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals*	

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HSG.SRT.A.2 Given two figures use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	The following knowledge, skills, and abilities are represented in these standards: • Explain the ideas of congruence (same figures same size) and similarity (same shape different size) • Make comparisons and solve problems.
HSG.SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	
HSG.SRT.C.7 Explain and use the relationship between the sine and cosine of complementary angles.	
HSG.SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★	
HSG.C.A.2 Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*	The following knowledge, skills, and abilities are represented in these standards: • Understand concepts about circles • Understand relationships with chords, radii, and arcs in circles
HSG.C.A.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	
HSG.C.B.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	

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HSG.GPE.B.4 Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*	The following knowledge, skills, and abilities are represented in these standards: • Connect algebra and geometry • Explain algebraic and geometric connections using coordinates
HSG.GMD.A.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments*. HSG.GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★	The following knowledge, skills, and abilities are represented in these standards: • Solve problems involving 3-dimensional shapes. • Understand how cross sections and characteristics of 2– and 3-dimensional objects relate to formulas

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HSS.CP.A.2 Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	The following knowledge, skills, and abilities are represented in these standards: • Find the likelihood of events taking place • Understand and explain the likelihood of events taking place
HSS.CP.A.3 Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.	
HSS.CP.A.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*	
HSS.CP.B.7 Apply the Addition Rule, P (A or B) = P (A) + P (B) – P (A and B), and interpret the answer in terms of the model.	
HSA.SSE.A.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.	The following knowledge, skills, and abilities are represented in these standards: • Understand the meaning of expressions and use the structure of an expression to solve problems • Solve problems involving quadratic expressions.

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HSA.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* HSA.SSE.B.3.a Factor a quadratic expression to reveal the zeros of the function it defines. HSA.SSE.B.3.b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	The following knowledge, skills, and abilities are represented in these standards: • Understand the meaning of expressions and use the structure of an expression to solve problems • Solve problems involving quadratic expressions.
HSA.REI.B.4 Solve quadratic equations in one variable. HSA.REI.B.4.a Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x - p)2 = q that has the same solutions. Derive the quadratic formula from this form. HSA.REI.B.4.b Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.	The following knowledge, skills, and abilities are represented in these standards: • Solve quadratic equations • Construct logical arguments to justify the steps used in solving an equation

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HSA.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions and simple rational and exponential functions.*		The following knowledge, skills, and abilities are represented in these standards: • Apply concepts about expressions, inequalities, and systems of equations to solve real world situations • Understand the relationships described by equations, inequalities, and systems of equations and the effect of change to variable(s) in these relationships.
HSA.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	HSA.REI.D.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	
HSA.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law (V = IR) to highlight resistance R.		

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HSF.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*[*]	HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity*.[*]	The following knowledge, skills, and abilities are represented in these standards: • Use graphs to model quantitative relationships, based on numerical, verbal, and algebraic representation • Explain the rate of change in functions as they relate to real world representations.
HSF.IF.B.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.[*]	HSS.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	
HSF.IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.[*] HSF.IF.C.7.a Graph linear and quadratic functions and show intercepts, maxima, and minima.	HSS.ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. HSS.ID.B.6.a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. HSS.ID.B.6.c Fit a linear function for a scatter plot that suggests a linear association.	

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HSF.IF.C.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. HSF.IF.C.8.a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. HSF.IF.C.8.b Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)^t/10$, and classify them as representing exponential growth or decay.	HSF.IF.C.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum*.	

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HSF.BF.A.1 Write a function that describes a relationship between two quantities.* HSF.BF.A.1.a Determine an explicit expression, a recursive process, or steps for calculation from a context.	HSF.IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. HSF.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	The following knowledge, skills, and abilities are represented in these standards: • Describe the relationship of a function and impact of change on the function. • Use graphs to display functions
HSF.BF.B.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.		

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